

WHAT IS CLAIMED IS:

1. A cell comprising a functional oligomeric phycobiliprotein comprising a fusion protein comprising a functional displayed domain and a functional phycobiliprotein domain.
- 5 2. The cell of claim 1, wherein the phycobiliprotein domain is a natural phycobiliprotein domain.
3. The cell of claim 1, wherein the functional oligomeric phycobiliprotein is an α,β heterodimer.
- 10 4. The cell of claim 1, wherein the displayed domain comprises a moiety selected from the group consisting of an affinity tag, an oligomerization moiety, a specific binding moiety, and a signaling moiety.
- 15 5. The cell of claim 1, wherein the fusion protein further comprises a specific binding moiety selected from a streptavidin biotin-binding moiety, a biotinylated or biotinylatable moiety, and an antigen binding immunoglobulin moiety.
6. The cell of claim 1, wherein the fusion protein further comprises a linker peptide between the displayed domain and the phycobiliprotein domain.
- 20 7. The cell of claim 1, wherein the fusion protein further comprises a protease cleavage site between the displayed domain and the phycobiliprotein domain.
8. The cell of claim 1, wherein the phycobiliprotein domain comprises at least one functionally attached bilin.
- 25 9. The cell of claim 1, wherein the displayed domain is refractive to expression in *E. coli*.

10. The cell of claim 1, wherein the oligomeric phycobiliprotein is assembled in a functional phycobilisome.

11. The cell of claim 1, wherein the oligomeric phycobiliprotein provides a fluorescent tag.

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12. The cell of claim 1, wherein the displayed domain is substantially transparent to wavelengths of visible light absorbed by phycobiliproteins.

13. The cell of claim 1, wherein the displayed domain is substantially transparent to wavelengths of energy emitted by the phycobiliprotein domain.

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14. The cell of claim 1, wherein the cell is or is a progeny of a cell which naturally expresses a phycobiliprotein.

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15. The cell of claim 1, wherein the cell is a cyanobacterium.

16. The cell of claim 1, wherein the cell is a rhodophyte (red algae).

17. The cell of claim 1, wherein the cell is a cryptomonad.

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18. The cell of claim 1, wherein the cell is an Anabaena cell.

19. The cell of claim 1, which comprises a polynucleotide encoding the fusion protein, and produces the oligomeric phycobiliprotein.

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20. A method for making a functional oligomeric phycobiliprotein, comprising the step of incubating the cell of claim 19 to express the fusion protein and produce the oligomeric phycobiliprotein.

21. A method for making a functional displayed domain, comprising the step of incubating the cell of claim 19 to express the fusion protein and produce the oligomeric phycobiliprotein, cleaving a peptide bond between the functional displayed domain and the functional phycobiliprotein domain; and separating the functional displayed domain from the functional phycobiliprotein domain.

22. The method of claim 21, which provides improved functional folding of the displayed domain, as compared with expression of the displayed domain not fused to the phycobiliprotein domain.